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JUL 18 2007

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (original): Apparatus for processing a multi-channel audio signal, the multi-channel audio signal having at least three original channels, comprising:

means for providing a first downmix channel and a second downmix channel, the first and the second downmix channels being derived from the original channels;

means for calculating channel side information for a selected original channel of the original signals, the means for calculating being operative to calculate the channel side information such that a downmix channel or a combined downmix channel including the first and the second downmix channel, when weighted using the channel side information, results in an approximation of the selected original channel; and

means for generating output data, the output data including the channel side information.

Claim 2 (original): Apparatus in accordance with claim 1, in which the means for generating is operative to generate the

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output data such that the output data additionally include the first downmix channel or a signal derived from the first downmix channel and the second downmix channel or a signal derived from the second downmix channel.

Claim 3 (original): Apparatus in accordance with claim 1, in which the means for calculating is operative to determine the channel side information as parametric data not including time domain samples or spectral values.

Claim 4 (original): Apparatus in accordance with claim 1, in which the means for calculating is operative to perform joint stereo coding using a downmix channel as a carrier channel and using, as an input channel, the selected original channel, to generate joint stereo parameters as channel side information for the selected original channel.

Claim 5 (original): Apparatus in accordance with claim 3, in which the means for calculating is operative to perform intensity stereo coding or binaural cue coding, such that the channel side information represent an energy distribution or binaural cue parameters for the selected original channel, wherein a downmix channel or a combined downmix channel is usable as a carrier channel.

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Claim 6 (original): Apparatus in accordance with claim 1,

in which the multi-channel audio signal includes a left channel, a left surround channel, a right channel and a right surround channel,

in which the means for providing is operative to provide the first downmix channel as a left downmix channel and to provide the second downmix channel as a right downmix channel, the left and the right downmix channels being formed such that a result, when played, is a stereo representation of the multi-channel audio signal, and

in which the means for calculating is operative

to calculate the channel side information for the left channel as the selected original channel using the left downmix channel,

to calculate the channel side information for the right channel as the selected original channel using the right downmix channel,

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to calculate the channel side information for the left surround channel as the selected original channel using the left downmix channel, and

to calculate the channel side information for the right surround channel as the selected original channel using the right downmix channel.

Claim 7 (original): Apparatus in accordance with claim 1,

in which the original channels include a center channel,

which further includes a combiner for combining the first downmix channel and the second downmix channel to obtain the combined downmix channel; and

wherein the means for calculating the channel side information for the center channel as the selected original channel is operative to calculate the channel side information such that the combined downmix channel when weighted using the channel side information results in an approximation of the original center channel.

Claim 8 (original): Apparatus in accordance with claim 1, in which the means for providing is operative to derive the first

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downmix channel and the second downmix channel from the original channels using a first predetermined linear weighted combination for the first downmix channel and using a second predetermined linear weighted combination for the second downmix channel.

Claim 9 (original): Apparatus in accordance with claim 7, in which the first predetermined linear weighted combination is defined as follows:

$$L_c = t \cdot (L + a \cdot L_s + b \cdot C); \text{ or}$$

in which the predetermined second linear weighted combination is defined as follows:

$$R_c = t \cdot (R + a \cdot R_s + b \cdot C),$$

wherein L_c is the first downmix channel, wherein R_c is the second downmix channel, wherein t , a and b are weighting factors smaller than 1, wherein L is an original left channel, wherein C is an original center channel, wherein R is an original right channel, wherein L_s is an original left surround channel, and wherein R_s is an original right surround channel.

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Claim 10 (original): Apparatus in accordance with claim 1, in which the means for providing is operative to receive externally supplied first and second downmix channels.

Claim 11 (currently amended): Apparatus in accordance with claim 1, in which the first downmix channel and the second downmix channel are ~~composite channels being composite of~~ generated by combining the original channels in varying degrees, wherein the means for calculating is operative, to use, for calculating the channel side information, the downmix channel among both downmix channels, which is stronger influenced by the selected original channel when compared to the other downmix channel.

Claim 12 (original): Apparatus in accordance with claim 1, in which the means for generating is operative to form the output data such that the output data are in compliance with an output data syntax to be used by a low level decoder for processing the first downmix channel or a signal derived from the first downmix channel or the second downmix channel or a signal derived from the second downmix channel to obtain a decoded stereo representation of the multi-channel audio signal.

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Claim 13 (original): Apparatus in accordance with claim 12, in which the output data syntax is structured such that same includes a special data field to be ignored by a low level decoder, and in which the means for generating is operative to insert the channel side information into the special data field.

Claim 14 (original): Apparatus in accordance with claim 13, in which the syntax is mp3 syntax and the special data field is an ancillary data field.

Claim 15 (original): Apparatus in accordance with claim 12, in which the means for generating is operative to insert the channel side information into the output data such that the channel side information are only used by a high level decoder but are ignored by the low level decoder.

Claim 16 (original): Apparatus in accordance with claim 2, which further comprises an encoder for encoding the first downmix channel to obtain the signal derived from the first downmix channel or for encoding the second downmix channel to obtain the signal derived from the second downmix channel.

Claim 17 (original): Apparatus in accordance with claim 16, in which the encoder is a perceptual encoder which includes

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means for converting a signal to be encoded into a spectral representation, means for quantizing the spectral representation using a psychoacoustic model and means for entropy encoding a quantized spectral representation to obtain an entropy encoded quantized spectral representation as the signal derived from the first downmix channel or the signal derived from the second downmix channel.

Claim 18 (original): Apparatus in accordance with claim 17, in which the perceptual encoder is an encoder in accordance with MPEG-1/2 layer III (mp3) or MPEG-2/4 advanced audio coding (AAC).

Claim 19 (original): Apparatus in accordance with claim 1, in which the means for calculating is operative to calculate downmix energy values for the downmix channel or the combined downmix channel,

to calculate an original energy value for the selected original channel, and

to calculate a gain factor as the channel side information, the gain factor being derived from the downmix energy value and the original energy value.

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Claim 20 (original): Apparatus in accordance with claim 1, in which the means for calculating is operative to calculate frequency dependent channel side information parameters such that for a plurality of frequency bands, a plurality of different channel side information parameters are obtained.

Claim 21 (original): Method of processing a multi-channel audio signal, the multi-channel audio signal having at least three original channels, comprising:

providing a first downmix channel and a second downmix channel, the first and the second downmix channels being derived from the original channels;

calculating channel side information for a selected original channel of the original signals such that a downmix channel or a combined downmix channel including the first and the second downmix channel, when weighted using the channel side information, results in an approximation of the selected original channel; and

generating output data, the output data including the channel side information.

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Claim 22 (original): Apparatus for inverse processing of input data, the input data including channel side information, a first downmix channel or a signal derived from the first downmix channel and a second downmix channel or a signal derived from the second downmix channel, wherein the first downmix channel and the second downmix channel are derived from at least three original channels of a multi-channel audio signal, and wherein the channel side information are calculated such that a downmix channel or a combined downmix channel including the first downmix channel and the second downmix channel, when weighted using the channel side information, results in an approximation of the selected original channel, the apparatus comprising:

an input data reader for reading the input data to obtain the first downmix channel or a signal derived from the first downmix channel and the second downmix channel or a signal derived from the second downmix channel and the channel side information; and

a channel reconstructor for reconstructing the approximation of the selected original channel using the channel side information and the downmix channel or the combined downmix channel to obtain the approximation of the selected original channel.

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Claim 23 (currently amended): Apparatus in accordance with claim 22, further comprising a ~~perceptual~~ decoder for decoding the signal derived from the first downmix channel to obtain the decoded version of the first downmix channel and for decoding the signal derived from the second downmix channel to obtain a decoded version of the second downmix channel.

Claim 24 (original): Apparatus in accordance with claim 22, further comprising a combiner for combining the first downmix channel and the second downmix channel to obtain the combined downmix channel.

Claim 25 (original): Apparatus in accordance with claim 22,

in which the original audio signal includes a left channel, a left surround channel, a right channel, a right surround channel and center channel,

wherein the first downmix channel and the second downmix channel are a left downmix channel and a right downmix channel, respectively, and

wherein the input data include channel side information for at least three of the left channel, the left surround

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channel, the right channel, the right surround channel and the center channel,

wherein the channel reconstructor is operative

to reconstruct an approximation of the left channel using channel side information for the left channel and the left downmix channel,

to reconstruct an approximation for the left surround channel using channel side information for the left surround channel and the left downmix channel,

to reconstruct an approximation for the right channel using channel side information for the right channel and the right downmix channel, and

to reconstruct an approximation for the right surround channel using channel side information for the right surround channel and the right downmix channel.

Claim 26 (original): Apparatus in accordance with claim 22, in which the channel reconstructor is operative to reconstruct an approximation for the center channel using channel side

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information for the center channel and the combined downmix channel.

Claim 27 (original): Method of inverse processing of input data, the input data including channel side information, a first downmix channel or a signal derived from the first downmix channel and a second downmix channel or a signal derived from the second downmix channel, wherein the first downmix channel and the second downmix channel are derived from at least three original channels of a multi-channel audio signal, and wherein the channel side information are calculated such that a downmix channel or a combined downmix channel including the first downmix channel and the second downmix channel, when weighted using the channel side information, results in an approximation of the selected original channel, the method comprising:

reading the input data to obtain the first downmix channel or a signal derived from the first downmix channel and the second downmix channel or a signal derived from the second downmix channel and the channel side information; and

reconstructing the approximation of the selected original channel using the channel side information and the downmix

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channel or the combined downmix channel to obtain the approximation of the selected original channel.

Claim 28 (original): A computer implemented ~~Computer program~~
~~having a program code for performing a~~ method of processing a
multi-channel audio signal, the multi-channel audio signal
having at least three original channels, comprising:

providing a first downmix channel and a second downmix
channel, the first and the second downmix channels being
derived from the original channels;

calculating channel side information for a selected
original channel of the original signals such that a downmix
channel or a combined downmix channel including the first and
the second downmix channel, when weighted using the channel
side information, results in an approximation of the selected
original channel; and

generating output data, the output data including the
channel side information.

Claim 29 (original): A computer implemented ~~Computer program~~
~~having a program code for performing a~~ method for inverse
processing of input data, the input data including channel

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side information, a first downmix channel or a signal derived from the first downmix channel and a second downmix channel or a signal derived from the second downmix channel, wherein the first downmix channel and the second downmix channel are derived from at least three original channels of a multi-channel audio signal, and wherein the channel side information are calculated such that a downmix channel or a combined downmix channel including the first downmix channel and the second downmix channel, when weighted using the channel side information, results in an approximation of the selected original channel, the method comprising:

reading the input data to obtain the first downmix channel or a signal derived from the first downmix channel and the second downmix channel or a signal derived from the second downmix channel and the channel side information; and

reconstructing the approximation of the selected original channel using the channel side information and the downmix channel or the combined downmix channel to obtain the approximation of the selected original channel.